

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference P2001, 0126W0	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, Item 5 below.	
International application No. PCT/EP 02/02030	International filing date (day/month/year) 25/02/2002	(Earliest) Priority Date (day/month/year) 23/02/2001
Applicant INFINEON TECHNOLOGIES AG		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (see Box II).

4. With regard to the title,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the abstract,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

3

as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.



None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 02/02030

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H01L21/3213

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

PAJ, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6 159 863 A (CHEN ET AL) 12 December 2000 (2000-12-12) abstract; figure 4	1-9
Y	WO 96 27899 A (IBM) 12 September 1996 (1996-09-12) page 2, paragraph 3 - page 3, paragraph 1	1-9
Y	US 6 136 211 A (QIAN ET AL) 24 October 2000 (2000-10-24) column 1, line 1 - line 61	1-8
A	US 5 468 686 A (KAWAMOTO) 21 November 1995 (1995-11-21) column 3, line 1 - line 22	6,7
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☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

Z document member of the same patent family

Date of the actual completion of the international search

17 July 2002

Date of mailing of the international search report

25/07/2002

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 02/02030

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 776 832 A (HSIEH ET AL) 7 July 1998 (1998-07-07) column 6, line 12 - line 14 -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 02/02030

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6159863	A	12-12-2000	EP 1166344 A1 WO 0044037 A1	02-01-2002 27-07-2000
WO 9627899	A	12-09-1996	EP 0731501 A1 WO 9627899 A1 JP 9509017 T	11-09-1996 12-09-1996 09-09-1997
US 6136211	A	24-10-2000	EP 1029345 A1 JP 2001523044 T WO 9925015 A1 US 6322714 B1	23-08-2000 20-11-2001 20-05-1999 27-11-2001
US 5468686	A	21-11-1995	JP 2674488 B2 JP 7153746 A KR 145645 B1	12-11-1997 16-06-1995 02-11-1998
US 5776832	A	07-07-1998	NONE	

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(19) World Intellectual Property Organization
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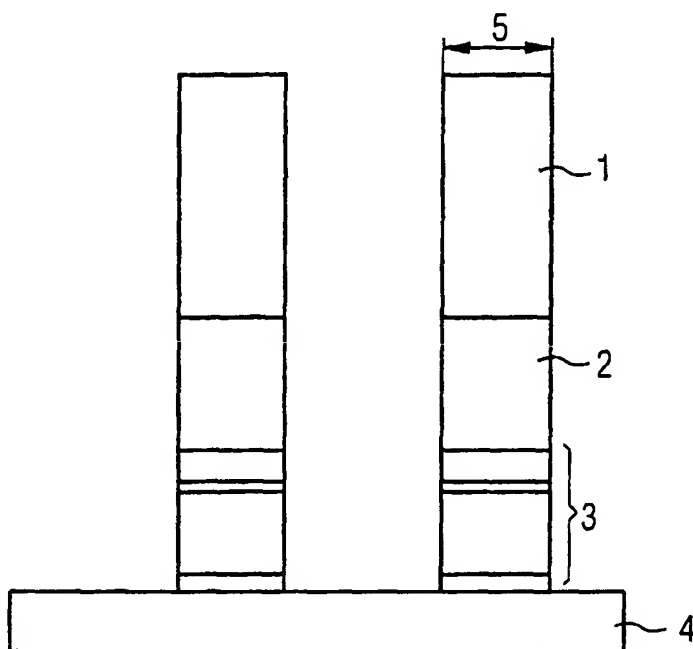
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WO 02/073682 A1

- (51) International Patent Classification⁷: **H01L 21/3213** (74) Agent: **EPPING, HERMANN & FISCHER**; Ridlerstr. 55, 80339 München (DE).
- (21) International Application Number: **PCT/EP02/02030**
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- (26) Publication Language: English
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— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
- (71) Applicant (*for all designated States except US*): **INFINEON TECHNOLOGIES AG** [DE/DE]; St.-Martin-Str. 53, 81669 München (DE).
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- (75) Inventor/Applicant (*for US only*): **BAIER, Ulrich** [DE/DE]; Thomas-Müntzer-Platz 7, 01307 Dresden (DE). For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD FOR ETCHING A HARDMASK LAYER AND A METAL LAYER



(57) Abstract: The present invention relates to an improved insitu hardmask open strategy which is performed before carrying out a metal etch. The method for opening the hardmask (2) made of SiO₂, Si₃N₄ or SiON comprises the steps of providing a substrate having thereon at least one metal layer (3), a hardmask layer made of SiO₂, Si₃N₄ or SiON and a patterned photoresist layer overlying said hardmask layer (2), etching said hardmask layer (2) in a plasma etching process using an etchant source gas which comprises a fluorine containing gas and oxygen, wherein the plasma processing chamber used for etching the hardmask layer (2) is the same as the plasma processing chamber in which the at least one metal layer (3) is etched in another plasma etching process after the hardmask layer (2) has been etched.

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